



## News from the NCI

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Definitions of Scientific Terms

### Low-Tar Cigarettes: Evidence Does Not Indicate a Benefit to Public Health

Millions of Americans smoke "low-tar," "mild," or "light" cigarettes, believing those cigarettes to be less harmful than other cigarettes. In a new monograph from the National Cancer Institute (NCI) titled *Risks Associated with Smoking Cigarettes with Low Machine-Measured Yields of Tar and Nicotine*\*, national scientific experts conclude that evidence does not indicate a benefit to public health from changes in cigarette design and manufacturing over the last 50 years.

"This report was made possible by the work and cooperation of scientists throughout the country," said Scott Leischow, Ph.D., chief of the NCI Tobacco Control Research Branch. "The monograph clearly demonstrates that people who switch to low-tar or light cigarettes from regular cigarettes are likely to inhale the same amount of cancer-causing toxins and they remain at high risk for developing smoking-related cancers and other diseases." This monograph is the 13<sup>th</sup> volume in NCI's Smoking and Tobacco Control Monograph Series, which began in 1991.

#### Public Health Effects

Epidemiologic studies (studies that examine the relationship of risk factors to health and disease) in the late 1960s and 1970s found that smokers of lower-tar or filtered cigarettes had somewhat lower lung cancer risks than smokers of other cigarettes. This finding was particularly noteworthy because smokers in these studies had been smoking the reduced-yield cigarettes for only a relatively short period of time. It was predicted that as more smokers used lower yield products for longer periods of time, a greater benefit would occur and national lung cancer death rates would fall.

Unfortunately, these reductions have not been seen. Even as the popularity of lower-yield cigarettes grew - 97 percent of the cigarettes now sold in the United States are filtered cigarettes - lung cancer rates continued to rise until the early 1990s. The monograph demonstrates that the overall decline that has been seen since the 1990s can be attributed to the decrease in smoking prevalence, and not to changes in cigarette design.

The new monograph reviews published literature on death rates in the U.S. and the United Kingdom which also demonstrated an increase - rather than a decrease - in smoking risks over a period when machine-measured yields of tar and nicotine were declining. Two studies conducted by the American Cancer Society more than 20 years apart found that, despite the large reduction in machine-measured tar yield over this period, smokers in the later study had an increased risk of lung cancer. This

increase was seen even when differences in the number of cigarettes smoked per day and duration of smoking were factored into the analysis. The monograph clearly demonstrates that the expected reduction in lung cancer risk offered by the early epidemiologic studies has not been seen in national lung cancer death rate trends.

Surveys have indicated that among the estimated 47 million adults who smoke in the United States, people who are most concerned about smoking risks or are most interested in quitting use brands labeled "light" or "ultra-light." Unfortunately, the monograph finds that choosing lower-yield cigarettes is not likely to reduce tar intake and resulting disease risks. Furthermore, marketing and promotion of reduced yield products may delay genuine attempts to quit. There is no evidence that switching to light or ultra-light cigarettes actually assists smokers in quitting.

According to David M. Burns, M.D., senior scientific editor of the monograph and a professor at the University of California, San Diego School of Medicine, "The take-home message of this report is that the only proven way to reduce the disease risks associated with smoking is to quit."

### **New Testing Method Needed**

Currently, measurements of tar, nicotine, and carbon monoxide are obtained by machine measurement using the Federal Trade Commission (FTC) testing method. However, studies now show that the FTC method does not appropriately mimic human smoking behavior. The monograph concludes that: "Measurements of tar and nicotine yields using the FTC method do not offer smokers meaningful information on the amount of tar and nicotine they will receive from a cigarette. The measurements also do not offer meaningful information on the relative amounts of tar and nicotine exposure likely to be received from smoking different brands of cigarettes."

According to Leischow, "There is an urgent need to develop new approaches to testing that offer meaningful information. Smokers should not believe that the tar and nicotine levels listed on a pack of cigarettes are what they are actually inhaling."

The FTC has asked the Department of Health and Human Services (DHHS) for guidance to improve its testing method for tar and nicotine. NCI and other DHHS agencies will convene a working group to review and synthesize the science on this issue and to determine what changes should be made to the testing method to correct the limitations identified in the monograph.

### **Smokers Compensate**

The monograph describes several reasons why the levels of tar and nicotine measured by the FTC method do not reflect actual tar and nicotine delivery to the smoker. The filters in low-tar/low-nicotine cigarettes often include vent holes which, when open, allow air to enter and dilute the smoke. However, many smokers cover these holes with their lips and fingers. In contrast, when tested by a machine, the holes are unobstructed, and artificially low measurements of tar and nicotine are obtained. In addition, smokers who switch to low-tar or low-nicotine cigarettes from regular cigarettes "compensate" for the lower nicotine level by inhaling more deeply; taking larger, more rapid, or more frequent puffs; or by increasing the number of cigarettes smoked per day. As a result, smokers cancel out any potential benefit of smoking a "low-tar" cigarette.

The monograph describes the advertising and promotional strategies used by the tobacco industry to market lower-yield cigarettes. It concludes that these strategies were intended to reassure smokers and to prevent them from quitting, and that they led consumers to perceive filtered and low-tar

products as safer alternatives to regular cigarettes. The monograph also cites internal tobacco industry documents that demonstrate the industry's early knowledge of the discrepancy between the FTC machine-measured yields of tar and nicotine and what the smoker actually inhales.

### Future Research

The authors note that continued research, as well as tracking of the diseases caused by smoking, is necessary to determine the disease risks associated with recently introduced "reduced exposure" cigarettes or cigarette-like products. Further study on the health risks of individuals who have smoked only "low-yield," "ultra-low-yield," and "low-carcinogen" cigarettes is also needed.

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\*The senior scientific editor of the monograph is David M. Burns, M.D. (University of California, San Diego), and the co-scientific editor is Neal L. Benowitz, M.D. (University of California, San Francisco).

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- To view a series of Questions and Answers related to this monograph, please visit <http://newscenter.cancer.gov/pressreleases/lowtarQA.html>.
- For more information about *Risks Associated with Smoking Cigarettes with Low Machine-Measured Yields of Tar and Nicotine* and to view the complete monograph online, please visit [http://cancercontrol.cancer.gov/tcrb/nci\\_monographs](http://cancercontrol.cancer.gov/tcrb/nci_monographs).
- To order a copy of the monograph, please call NCI's Cancer Information Service at 1-800-4-CANCER (1-800-422-6237) or visit NCI's Publications Locator Web site at <http://www.cancer.gov/publications>
- To learn about the monograph series and tobacco control programs at the NCI, please visit NCI's Tobacco Control Research Branch at <http://cancercontrol.cancer.gov/tcrb>.
- To learn about tobacco control programs at the Office on Smoking and Health (OSH) at the Centers for Disease Control and Prevention, visit OSH's Web site at <http://www.cdc.gov/tobacco>.

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For more information about cancer, visit NCI's Web site at <http://www.cancer.gov>.

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